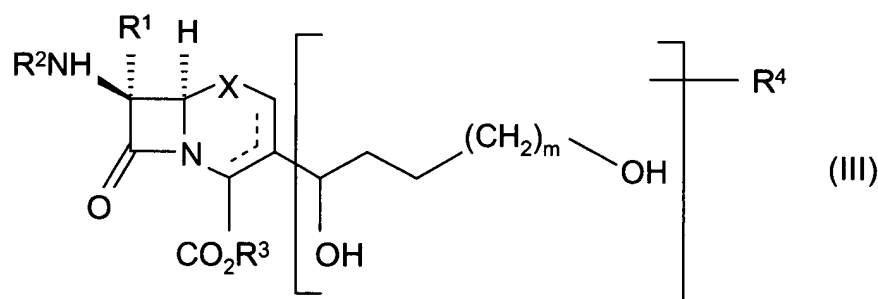


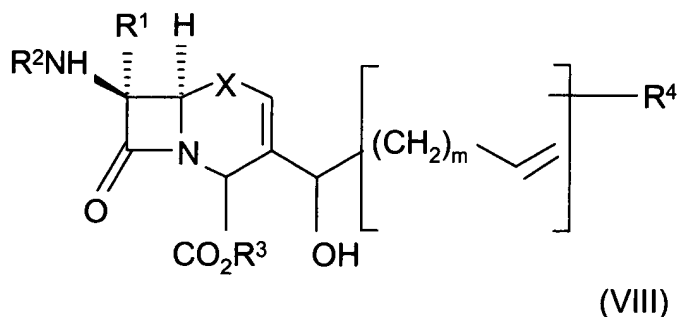
comprising cyclizing a compound of formula (III):



wherein in formulae (II) and (III),  $R^1$  is hydrogen, methoxy or formamido;  $R^2$  is an acyl group;  $R^3$  is hydrogen or a suitable carboxy protecting group;  $R^4$  represents hydrogen or up to four substituents selected from alkyl, alkenyl, alkynyl, alkoxy, halogen, amino, alkylamino, acylamino, dialkylamino,  $\text{CO}_2\text{R}$ ,  $\text{CONR}_2$ ,  $\text{SO}_2\text{NR}_2$  (where R is hydrogen or  $\text{C}_{1-6}$  alkyl), aryl and heterocyclyl, which may be the same or different; X is S, SO,  $\text{SO}_2$ , O, or  $\text{CH}_2$ ; and m is 1 or 2; and the dotted line indicates that the compounds (II) and (III) may be a 2-cephem or a 3-cephem system, and where in formula (III) the substituent(s)  $R^4$  when other than hydrogen may replace any of the hydrogen atoms bonded to carbon atoms in the side chain,

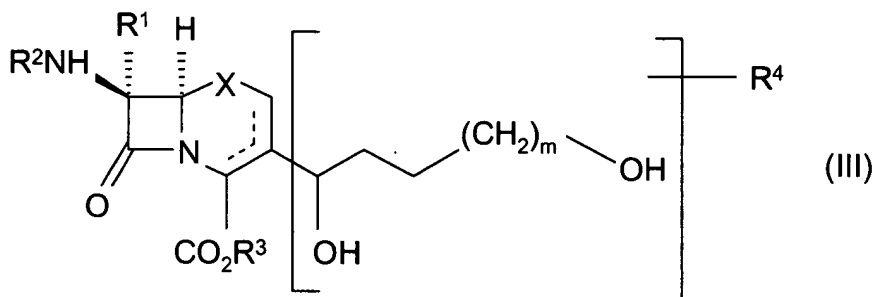
and, when  $R^3$  is hydrogen, optionally forming the carboxylate salt of said compound of formula III.

11. (Twice Amended) The process according to Claim 1 or 2, wherein the compound of formula III is prepared by coupling a compound of formula (IV) (as defined in claim 10) with an organometallic or boronate reagent to form a compound of formula (VIII):



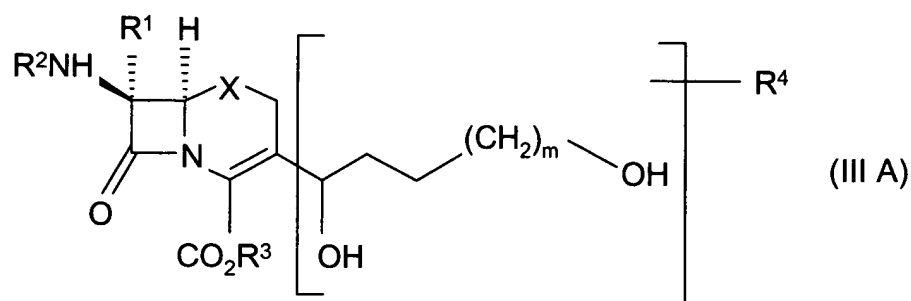
and wherein said compound of formula VIII is then hydroxylated to form a compound of formula III, where  $R^1$ ,  $R^2$ ,  $R^3$ ,  $R^4$ ,  $m$ , and  $X$  are as defined with respect to formula (III).

21. (Twice Amended) A compound of formula (III),

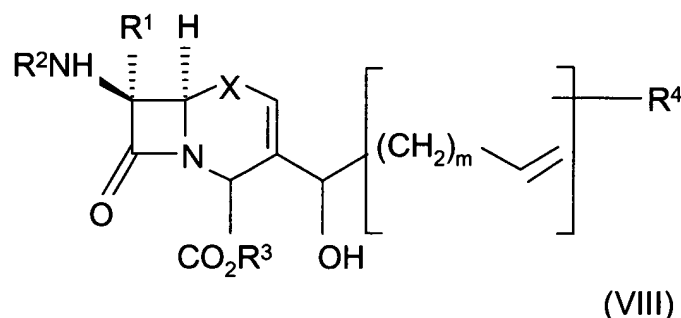


wherein  $R^1$  is hydrogen, methoxy or formamido;  $R^2$  is an acyl group;  $R^3$  is hydrogen or a suitable carboxy protecting group;  $R^4$  represents hydrogen or up to four substituents selected from alkyl, alkenyl, alkynyl, alkoxy, halogen, amino, alkylamino, acylamino, dialkylamino,  $\text{CO}_2\text{R}$ ,  $\text{CONR}_2$ ,  $\text{SO}_2\text{NR}_2$  (where  $R$  is hydrogen or  $\text{C}_{1-6}$  alkyl), aryl and heterocyclyl, which may be the same or different;  $X$  is  $\text{S}$ ,  $\text{SO}$ ,  $\text{SO}_2$ ,  $\text{O}$ , or  $\text{CH}_2$ ; and  $m$  is 1 or 2; and the dotted line indicates that the compound may be a 2-cephem or a 3-cephem system, and where the substituent(s)  $R^4$  when other than hydrogen may replace any of the hydrogen atoms bonded to carbon atoms in the side chain.

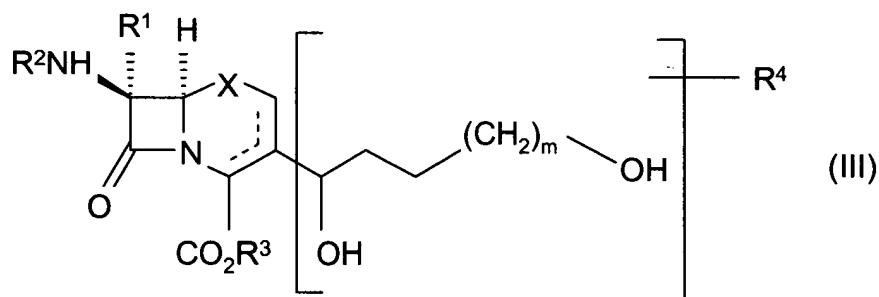
22. (Amended) The compound according to Claim 21, wherein the compound is a compound of formula IIIA



23. (Amended) A compound of formula VIII,



wherein  $R^1$ ,  $R^2$ ,  $R^3$ ,  $R^4$ , and  $m$  are defined with respect to formula III,



wherein  $R^1$  is hydrogen, methoxy or formamido;  $R^2$  is an acyl group;  $R^3$  is hydrogen or a carboxy protecting group;  $R^4$  represents hydrogen or up to four substituents selected from alkyl, alkenyl, alkynyl, alkoxy, halogen, amino, alkylamino, acylamino, dialkylamino,  $\text{CO}_2\text{R}$ ,  $\text{CONR}_2$ ,  $\text{SO}_2\text{NR}_2$  (where  $\text{R}$  is hydrogen or  $\text{C}_{1-6}$  alkyl), aryl and heterocyclyl, which may be the same or different;  $\text{X}$  is  $\text{S}$ ,  $\text{SO}$ ,  $\text{SO}_2$ ,  $\text{O}$ , or  $\text{CH}_2$ ; and  $m$  is 1 or 2; and the dotted line indicates that the compound may be